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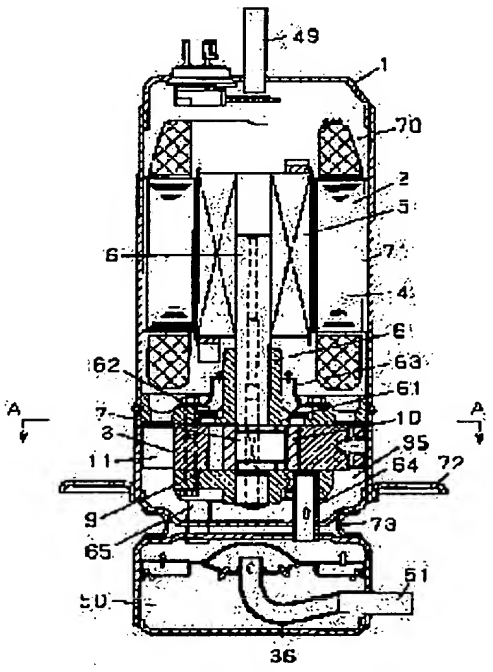
(54) ROLLING PISTON-TYPE ROTARY COMPRESSOR

(57)Abstract:
PROBLEM TO BE SOLVED: To decrease the adverse effect caused by pulsation to be generated in a suction passage of a rolling piston-type rotary compressor in which a plurality of compression chambers are provided in one cylinder.
SOLUTION: A common muffler chamber 50 is provided among suction ports of compression chambers and a compressor external suction pipe system, the lengths of communication pipes 64, 65 between the suction ports and the muffler chamber 50 are made approximately equal to each other. Therefore, approximately equal pulsations are generated on respective suction port paths, suction efficiency of respective chambers and compression torque fluctuation are similarly generated, torque fluctuation generated during one rotation of a driving shaft 6 is dispersed, and therefore, efficiency of an electric motor 2 can be improved, and vibration of a compressor piping system can be decreased.



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CLAIMS

[Claim(s)]
[Claim 1] The cylinder which has the cylinder inner surface which has arranged the motor and the compression zone inside a well-closed container, and was prepared in the cylinder block of said compression zone, The roller which carries out sheathing to the crank section of the driving shaft connected with said motor, and moves in accordance with the inner surface of said cylinder, Two or more blades into which the compression space which appears frequently in said cylinder from said cylinder block that a head should **** to the peripheral face of said roller, and is formed by said cylinder inner surface and peripheral face of said roller is divided with at equal intervals, In the rolling piston mold rotary compressor which equipped each divided compression space with inhalation opening and a delivery, respectively, while preparing a muffler room common between inhalation opening of each of said compression space, and the compressor external inhalation pipe line The rolling piston mold rotary compressor which arranged each inhalation path die length from said each inhalation opening to said muffler room in **** distance.
[Claim 2] The rolling piston mold rotary compressor according to claim 1 which has arranged the delivery of each compression space to the main bearing side which supported said driving shaft with said countershaft carrier, and has been arranged at said motor side while having arranged the muffler room to the countershaft carrier side which prepared in the location of a motor and an opposite hand, and supported the driving shaft, and adjoined the cylinder block.
[Claim 3] The rolling piston mold rotary compressor according to claim 2 with which each inhalation opening path of each compression space was arranged by penetrating a countershaft carrier to shaft orientations.
[Claim 4] The rolling piston mold rotary compressor according to claim 1 which has arranged the diaphragm and formed the muffler room between the edge wall of a well-closed container, and the countershaft carrier.
[Claim 5] The rolling piston mold rotary compressor according to claim 1 which has arranged the muffler room to the edge wall exterior of the near well-closed container of a countershaft carrier, penetrated the edge wall of said well-closed container outside, and prepared each inhalation opening path in it.
[Claim 6] The rolling piston mold rotary compressor according to claim 5 which has arranged the muffler room to the edge wall exterior of the near well-closed container of a countershaft carrier, penetrated the edge wall of said countershaft carrier and said well-closed container outside, and prepared the inhalation opening path in it.
[Claim 7] The rolling piston mold rotary compressor according to claim 5 which made the muffler room hold mainly to a well-closed container with the communicating tube which constitutes each inhalation opening path.
[Claim 8] The rolling piston mold rotary compressor according to claim 1 which arranged symmetrically with ** the opening location to the muffler room of each inhalation path to the

core of said muffler room.
[Claim 9] The rolling piston mold rotary compressor according to claim 1 which made the lowest style edge of the suction pipe linked to the compressor external inhalation pipe line invade to the center section of the muffler room, and made said lowest style edge arrange above the opening edge to the muffler room of each inhalation path.
[Claim 10] The rolling piston mold rotary compressor according to claim 1 which arranged the lowest style edge of the suction pipe connected to a common rough center to each opening to the muffler room of each inhalation path at the compressor external inhalation pipe line.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention relates to the inhalation path of a rotary compressor.
[0002]
[Description of the Prior Art] The structure of the rolling piston mold rotary compressor currently that to the compressor for air conditioning machines used is well-known so that it may be represented with the longitudinal section shown in drawing 4 , and the compression element section cross section shown in drawing 5 . [many]
[0003] That is, the compression zone 103 driven to a motor 102 and this motor 102 is formed in the interior of a well-closed container 101, and it is constituted, and is supported by the main bearing 108 and the countershaft carrier 109 which the driving shaft 106 of a compression zone 103 was connected with the motor 102, and have been arranged at the both sides of a cylinder block 111.
[0004] Inside the cylinder block 111 equipped with the cylinder 119, from the main shaft of a driving shaft 106, the roller 110 which carries out sheathing to the crank section 107 which carried out eccentricity approaches the wall of a cylinder 119, it is arranged, and compression space 115 is formed.
[0005] The spring equipment 113 which energizes the head of a blade 114 and a blade 114 on a roller 110 is arranged at the guide rail 112 of a cylinder block 111, and compression space 115 is divided at the inlet side and the compression side.
[0006] The inhalation opening 116 and the delivery 117 which carry out opening to a cylinder 119 bordering on a blade 114 are established in the cylinder block 111.
[0007] The accumulator 160 for storing a low-tension side refrigerant is connected to the inhalation opening 116.
[0008] However, the rotary compressor of a configuration of having such one compression space 115 has the technical problem that an oscillation damages the compressor pipe line greatly since compression torque fluctuation is large, and as shown in drawing 6 , the rolling piston mold rotary compressor equipped with two compression space in the cylinder 219 is proposed.
[0009] This drawing has arranged a blade 121 and spring equipment 122 to the guide rail 120

prepared in the cylinder block 111, has arranged a blade 124 and spring equipment 125 respectively to the guide rail 123, and is equipped with compression space 126 and compression space 127.
[0010] The inhalation opening 128 and a delivery 129 carry out opening to compression space 126, and the inhalation opening 130 and a delivery 131 are carrying out opening to compression space 127.
[0011] As shown in drawing 7 , 2 ****s of the compression torque ranges per one revolution of a driving shaft 206 are carried out, and a compressor oscillation reduces by half the compressor of a configuration of having had such two blades rather than the compressor of the configuration of drawing 4 and drawing 5 (JP,63-208688,A).
[0012] As drawing 8 R> 8, on the other hand, shows the compressor equipped with the inhalation opening 228 and the inhalation opening 230 to the above-mentioned cylinder block 211, it becomes the configuration which arranges the 1st accumulator 218 and 2nd accumulator 214 to an inlet side, and the configuration shown in drawing 9 for inhalation pipe-line simplification is proposed (JP,1-249977,A).
[0013] While an accumulator 350 penetrates the side attachment wall of a well-closed container 301 and is connected to the inhalation opening 349 of one compression space, the inhalation opening 349 is making inhalation opening of the compression space of another side open this drawing for free passage through the communicating tube 363 in a well-closed container 301. The communicating tube 363 bypasses the bearing boss section of the main bearing 334 which supports a driving shaft 336, and is constituted.
[0014]
[Problem(s) to be Solved by the Invention] However, with the above-mentioned conventional configuration, the technical problem based on inhalation gas flow occurred so that it might state below.
[0015] That is, the compression principle of the compressor which arranges two blades to the one above cylinder block, and forms two compression space in a cylinder is as being shown in drawing 10 (a) - drawing 10 (d).
[0016] That is, the space shown with the slash in drawing 10 (a) shows the condition of the maximum inhalation cylinder capacity of compression space. The space shown with the slash in drawing 1010 (b) shows compression space just before inhalation opening is blockaded in the state of the minimum inhalation cylinder capacity of compression space, and is reducing it from the condition of the maximum inhalation cylinder capacity in drawing 10 (a). Reduction of this inhalation cylinder capacity means that an inhalation gas flows backwards to the inhalation pipe line through inhalation opening. Inhalation opening is blockaded and the space shown with the slash in drawing 10 (c) shows the condition of substantial compression initiation. The space shown with the slash in drawing 10 (d) shows the condition of being discharged from compression space through a delivery, as a result of lifting of the compression space pressure.
[0017] Since the inflow and back run of an inhalation gas in such inhalation and a compression stroke arose, with the configuration from which the path die length by the diversion of river of an unequal inhalation path like drawing 9 and the detour of an inhalation path differs, the pulsation produced for an inhalation path interfered each other, consequently inhalation path resistance became large, and the technical problem that compression efficiency fell remarkably was.
[0018] This invention solves such a conventional technical problem, and it aims at aiming at improvement in compression efficiency, and oscillating reduction of the inhalation pipe line.
[0019]
[Means for Solving the Problem] In order to solve the above-mentioned technical problem, this invention prepares a muffler room common between inhalation opening of each compression space, and the compressor external inhalation pipe line, and eases the pulsating interference to each inhalation opening path.
[0020] By installation of the above-mentioned muffler room, pulsation of a compressor external suction-pipe system decreases, there is little aisle resistance of the inhalation pipe line, and the improvement in inhalation effectiveness and oscillating reduction of a compressor are obtained.
[0021]

[Embodiment of the Invention] Invention according to claim 1 arranges the inhalation path die length from each inhalation opening to a muffler room in **** distance while preparing a muffler room common between inhalation opening of each compression space, and the compressor external inhalation pipe line. And according to this configuration, equivalent pulsation arises for each inhalation opening path, and torque fluctuation while it generates similarly and a driving shaft also turns the inhalation effectiveness of each compression space and each compression torque fluctuation distributes. Consequently, oscillating reduction of the improvement in effectiveness of a motor and the compressor pipe line can be performed.
[0022] While invention according to claim 2 arranges a muffler room to the countershaft carrier side which prepared in the location of a motor and an opposite hand, and supported the driving shaft, and adjoined the cylinder block, it arranges a delivery to the main bearing side which supported the driving shaft with the countershaft carrier, and has been arranged at the motor side. And while according to this configuration the distance of main bearing and a motor becomes short and can lessen deformation of a driving shaft, installation becomes possible with the gestalt of arbitration about the muffler room of sufficient space which pulsating absorption takes.
[0023] Each inhalation opening path penetrates a countershaft carrier to shaft orientations, and invention according to claim 3 is arranged. And according to this configuration, since each inhalation opening path becomes short, pulsation decreases and oscillating reduction and inhalation effectiveness of the compressor external inhalation pipe line improve.
[0024] Between the edge wall of a well-closed container, and a countershaft carrier, invention according to claim 4 arranges a diaphragm, and forms a muffler room. And according to this configuration, each inhalation opening path can be shortened most and the effect by the pulsation produced in each inhalation opening path can be avoided.
[0025] Invention according to claim 5 arranges a muffler room to the edge wall exterior of the near well-closed container of a countershaft carrier, penetrates the edge wall of a well-closed container outside, and prepares an inhalation opening path in it. And according to this configuration, shortening of an inhalation opening path and heating prevention of a muffler room can be aimed at simultaneously.
[0026] Invention according to claim 6 arranges a muffler room to the edge wall exterior of the near well-closed container of a countershaft carrier, penetrates the edge wall of a countershaft carrier and a well-closed container outside, and prepares an inhalation opening path in it. And according to this configuration, heating of an inhalation gas can be prevented by further shortening of an inhalation opening path.
[0027] Invention according to claim 7 makes a muffler room hold mainly to a well-closed container with the communicating tube which constitutes an inhalation opening path. And according to this configuration, installation of the muffler room to a well-closed container becomes simple.
[0028] Invention according to claim 8 arranges symmetrically with ** the opening location to the muffler room of an inhalation path to the core of a muffler room. And according to this configuration, the pulsating attenuation in a muffler room becomes large.
[0029] Invention according to claim 9 makes the lowest style edge of the suction pipe linked to the compressor external inhalation pipe line invade to the center section of the muffler room, and makes the lowest style edge arrange above the opening edge to the muffler room of each inhalation path. And according to this configuration, the vapor-liquid interflow object which flows into a muffler room from the compressor external inhalation pipe line can prevent flowing into each compression space as it is.
[0030] Invention according to claim 10 arranges the lowest style edge of the suction pipe connected to a common rough center to each opening to the muffler room of each inhalation path at the compressor external inhalation pipe line. And according to this configuration, the pulsating attenuation in a muffler room becomes still larger.
[0031]
[Example] The example of this invention is explained with reference to a drawing below.
[0032] (Example 1) Drawing 1 expresses the longitudinal section of a rolling piston mold rotary

refrigerant compressor, a motor 2 is arranged in the upper part inside a well-closed container 1, a compression zone 3 is arranged at the lower part, and the discharge tube 49 linked to the external pipe line of a compressor is connected to the up space of a motor 2. The muffler room 50 which is open for free passage to the bottom exterior of a well-closed container 1 at the inlet side of a compression zone 3 is arranged, and the suction pipe 51 is connected to the muffler room 50.

[0033] The main bearing 8 and the countershaft carrier 9 by which inscribed immobilization of the compression zone 3 was carried out at the well-closed container 1 are being fixed on both sides of the cylinder block 11.

[0034] The driving shaft 6 connected with the stator 5 of a motor 2 is supported by main bearing 8 and the countershaft carrier 9, and fitting of the roller 10 is carried out to the crank section 7 of a driving shaft 6.

[0035] As shown in drawing 2 , the guide rail 12 prepared in the cylinder block 11 is equipped with a blade 14, and the roller 10 contacts the head of a blade 14 by pressing with spring equipment 13. Moreover, the guide rail 23 prepared in the opposite hand location is equipped with a blade 24, and the roller 10 contacts the head of a blade 24 by pressing with spring equipment 25.

[0036] The delivery 29 and the delivery 31 are established for the inhalation opening 28 and the inhalation opening 30 which carry out opening to the compression space 26 divided with the blade 14 and the blade 24, and compression space 27 in the countershaft carrier 9 clamp-face side of a cylinder block 11 at the position of symmetry at the main bearing 8 clamp-face side of a cylinder block 11, respectively.

[0037] Discharge valve equipment 61, discharge valve equipment 62, and the regurgitation guide 63 are arranged at main bearing 8, and a part of regurgitation refrigerant path is accomplished.

[0038] The communicating tube 64 which is open for free passage to the inhalation opening 28, and the communicating tube 65 which is open for free passage to the inhalation opening 30 penetrate the pars basilaris ossis occipitalis of the countershaft carrier 9 and a well-closed container 1 to shaft orientations, and leads to the muffler room 50.

[0039] Silver low attachment immobilization is carried out in the pars basilaris ossis occipitalis of a well-closed container 1, and the outer wall of the muffler room 50, and the communicating tube 64 and the communicating tube 65 are constituted that the muffler room 50 should be supported.

[0040] The up space and lower space of the motor room 70 which contains a motor 2 are open for free passage at the cooling path 71 established in the outside of the stator 4 of a motor 2.

[0041] The sump 35 leads to the lower space of the motor room 70. The stoma 36 is formed in some suction pipes 51 which have trespassed upon the muffler room 50.

[0042] 72 is a compressor support saddle and 73 is the auxiliary holddown member of a well-closed container 1 and the muffler room 50.

[0043] The actuation is explained about the rolling piston mold rotary refrigerant compressor constituted as mentioned above.

[0044] The driving shaft 6 connected with the rotator 5 of a motor 6 follows on rotating, and a refrigerant gas is inhaled and compressed by the compression principle of above-mentioned drawing 10 (a) - drawing 10 (d) by compression space 26 and compression space 27, respectively, and is discharged at the motor room 70 through the annular path between discharge valve equipment 61, discharge valve equipment 62, main bearing 8, and the regurgitation guide 63.

[0045] Some lubricating oils contained in a refrigerant gas are separated, it returns to a sump 35, and the remaining lubricating oils are sent out to the compressor exterior through a discharge tube 49 with a refrigerant gas.

[0046] In case a regurgitation refrigerant gas passes the inside of the regurgitation guide 63, main bearing 8 is cooled.

[0047] On the other hand, after colliding with a failure wall surface, the refrigerant gas (a lubricating oil is included) which flowed into the muffler room 50 via the suction pipe 51 from the low-tension side of the refrigerating cycle pipe line separates some lubricating oils, and flows

into the inlet side of compression space 26 and compression space 27 by turns via the communicating tube 64 and the communicating tube 65.
[0048] An inner inhalation refrigerant gas goes the inside of the communicating tube 64 and the communicating tube 65 in and out like an inhalation line by compression space 26 and compression space 27 by inhalation / compression principle explained by drawing 10 (a) - drawing 10 (d).
[0049] Since the die length of the communicating tube 64 and the communicating tube 65 is short, the inhalation refrigerant gas which flows backwards the communicating tube 64 which led to compression space 26 is inhaled through the muffler room 50 by the communicating tube 65 with which the inhalation line of compression space 27 led to inside in an instant.
[0050] For this reason, pulsation of the inhalation refrigerant gas produced in the muffler room 50 is controlled. Moreover, when a refrigerant gas flows backwards the communicating tube 64 and the communicating tube 65, inner pressure up is [that there is nothing] as equal as the inhalation line in compression space 26 and compression space 27.
[0051] The lubricating oil which ** at the pars basilaris ossis occipitalis of the muffler room 50 is sucked up through a stoma 36 by negative pressure generating produced in case a refrigerant gas passes a suction pipe 51, and mixes in an inhalation refrigerant gas according to it.
[0052] While forming the muffler room 50 common between the inhalation opening 28 of compression space 26 and the inhalation opening 30 of compression space 27, and the compressor external inhalation pipe line as mentioned above according to the above-mentioned example By having made the die length of the communicating tube 64 between the inhalation opening 28, the inhalation opening 30, and the muffler room 50, and the communicating tube 65 almost the same In case a part of refrigerant gas inhaled by compression space 26 and compression space 27 flows backwards to the inhalation opening 28 and the inhalation opening 30 temporarily, pulsation makes the phase of 180 degrees within the communicating tube 64 and the communicating tube 65, and occurs in equivalent magnitude. For this reason, since the inhalation effectiveness of compression space 26 and compression space 27 and each compression torque fluctuation under the effect of pulsation arise symmetrically, torque fluctuation while a driving shaft 6 makes one revolution can be distributed. Consequently, oscillating reduction of the improvement in effectiveness of a motor and the compressor pipe line can be performed.
[0053] Moreover, each pulsation of the refrigerant gas spread in the muffler room 50 through the communicating tube 64 and the communicating tube 65 is decreased at the muffler room 50. That is, the refrigerant gas which flows backwards from the communicating tube 64 is attracted by the communicating tube 65 through the muffler room 50, and the refrigerant-gas pulsation spread from the communicating tube 64 is decreased. Consequently, since refrigerant-gas pulsation does not spread to the compressor external inhalation pipe line through a suction pipe 51, the oscillation of the compressor external inhalation pipe line can be lessened.
[0054] Moreover, since a remarkable supercharge operation of an inhalation refrigerant gas does not occur, a superfluous compression load can be prevented.
[0055] Moreover, according to the above-mentioned example, while arranging the muffler room 50 to the countershaft carrier 9 side, a delivery 29 and a delivery 31 are arranged to a main bearing 8 side. And since according to this configuration the distance of main bearing 8 and a motor 2 becomes short and the bending deformation of a driving shaft 6 decreases, the compressor oscillation and bearing wear by imbalance of a revolution drive system can be lessened.
[0056] Moreover, since installation becomes possible with the gestalt of arbitration about the muffler room 50 of space required for pulsating inhalation, a pulsating damping effect can be enlarged.
[0057] Moreover, since each inhalation opening path to the muffler room 50 becomes short by the communicating tube 64 and the communicating tube 65 having penetrated the countershaft carrier 9 to shaft orientations, and having arranged them according to the above-mentioned example, the magnitude of pulsation decreases. Consequently, the oscillation of the compressor external inhalation pipe line is reduced, and compressor inhalation effectiveness can be

improved.
[0058] Moreover, according to the above-mentioned example, by having arranged the muffler room 50 to the edge wall exterior of the near well-closed container 1 of the countershaft carrier 9, having penetrated the edge wall of a well-closed container 1 outside, and having formed the communicating tube 64 between the inhalation opening 28, the inhalation opening 30, and the muffler room 50, and the communicating tube 65 in it, shortening of an inhalation opening path and heating of the muffler room 50 are prevented, and compression efficiency can be improved.
[0059] Moreover, according to the above-mentioned example, by having arranged the muffler room 50 to the edge wall exterior of the near well-closed container 1 of the countershaft carrier 9, and having formed the communicating tube 64 and the communicating tube 65 which penetrate the edge wall of the countershaft carrier 9 and a well-closed container 1, while being able to lessen the pulsation produced inside the communicating tube 64 and the communicating tube 65 by further shortening of an inhalation opening path, heating of an inhalation refrigerant gas can be prevented.
[0060] Moreover, according to the above-mentioned example, arrangement of the muffler room 50 to a well-closed container 1 can be simply performed by having made the muffler room 50 hold mainly to a well-closed container 1 with the communicating tube 64 and the communicating tube 65 which constitute an inhalation opening path.
[0061] Moreover, according to the above-mentioned example, by having arranged symmetrically with ** the opening location to the muffler room 50 of the communicating tube 64 and the communicating tube 65 to the core of the muffler room 50, pulsating attenuation in the muffler room 50 can be enlarged, and the oscillation of the inhalation pipe line can be reduced.
[0062] Moreover, according to the above-mentioned example, by having arranged the lowest style edge of the suction pipe 51 connected to a common rough center at the compressor external inhalation pipe line to each opening to the muffler room 50 of the communicating tube 64 and the communicating tube 65, pulsating attenuation in the muffler room 50 can be enlarged further, and improvement in compression efficiency and the oscillation of the inhalation pipe line can be reduced.
[0063] (Example 2) Drawing 3 shows the configuration of the refrigerant compressor which contained the muffler room 81 to a well-closed container 80.
[0064] The interior of a well-closed container 80 is divided into upside high voltage space and the lower muffler room 81 by the diaphragm 82.
[0065] Welding seal of the periphery of a diaphragm 82 is carried out with the edge of up well-closed container 80a, and the edge of lower well-closed container 80b.
[0066] The lowest style edge of a suction pipe 83 was set as the location higher than the soffit section of the communicating tube 84 and the communicating tube 85 which is open for free passage to the inhalation opening 28 and the inhalation opening 30, and it has prevented that the refrigerant gas which flows into the muffler room 81 from a suction pipe 83 flows into the communicating tube 84 and the communicating tube 85 directly, without separating a lubricating oil. Other configurations are the same as that of drawing 1 .
[0067] According to the above-mentioned example, by having arranged the diaphragm 82 and having formed the muffler room 81 between the edge wall of a well-closed container 80, and the countershaft carrier 9, each inhalation opening path can be shortened most and the evil by the pulsation produced in each inhalation opening path can be avoided.
[0068] Moreover, according to the above-mentioned example, it can prevent that the vapor-liquid mixing refrigerant gas which flows into the muffler room 50 from the compressor external inhalation pipe line flows into compression space 26 and compression space 27 as it is by having made the lowest style edge of the suction pipe 51 linked to the compressor external inhalation pipe line invade to the center section of the muffler room 50, and having made the lowest style edge arrange above the opening edge to the muffler room 50 of the communicating tube 64 and the communicating tube 65.
[0069] Moreover, according to the above-mentioned example, although two blades 14 and 24 were arranged at equal intervals to the cylinder block 11, also when further many blades are arranged at equal intervals, the same operation effectiveness is demonstrated.

[0070] Moreover, although the above-mentioned example explained the refrigerant compressor, an operation and effectiveness with the same said of the case of the gas compressor which compresses other gases (for example, oxygen, nitrogen, helium, air, etc.) are produced.
[0071]
[Effect of the Invention] So that clearly from the above-mentioned example invention according to claim 1 While preparing a muffler room common between inhalation opening of each compression space, and the compressor external inhalation pipe line The inhalation path die length from each inhalation opening to a muffler room was arranged in **** distance, and according to this configuration, in case it flows backwards to each inhalation opening temporarily [the gas inhaled by each compression space / for 1 minute], pulsation makes the phase of 180 degrees in an inhalation opening path, and occurs in equivalent magnitude. For this reason, since the inhalation effectiveness of each compression space and each compression torque fluctuation under the effect of pulsation arise symmetrically, torque fluctuation while a driving shaft makes one revolution can be distributed. Consequently, oscillating reduction of the improvement in effectiveness of a motor and the compressor pipe line can be performed.
[0072] Moreover, each pulsation of the gas spread in a muffler room through an inhalation opening path is decreased at a muffler room. That is, the gas which flows backwards from an inhalation opening path is attracted by another inhalation opening path through a muffler room, and gas pulsation is decreased. Consequently, since pulsation of an inhalation gas does not spread to the compressor external inhalation pipe line, the oscillation of the compressor external inhalation pipe line can be lessened.
[0073] Moreover, a remarkable supercharge operation of an inhalation gas does not occur, but a superfluous compression load can be prevented. While arranging a muffler room to the countershaft carrier side which prepared invention according to claim 2 in the location of a motor and an opposite hand, and supported the driving shaft, and adjoined the cylinder block It is what has arranged the delivery to the main bearing side which supported the driving shaft with the countershaft carrier, and has been arranged at the motor side, and since according to this configuration the distance of main bearing and a motor becomes short and can lessen deformation of a driving shaft, the compressor oscillation and bearing wear by imbalance of a revolution drive system can be lessened.
[0074] Moreover, since installation becomes possible with the gestalt of arbitration about the muffler room of space required for pulsating absorption, a pulsating damping effect can be enlarged.
[0075] Each inhalation opening path penetrates a countershaft carrier to shaft orientations, and invention according to claim 3 is arranged. And according to this configuration, since each inhalation opening path to a muffler room becomes short, the magnitude of pulsation decreases. Consequently, the oscillation of the compressor external inhalation pipe line is reduced, and compressor inhalation effectiveness can be improved.
[0076] Between the edge wall of a well-closed container, and a countershaft carrier, invention according to claim 4 arranges a diaphragm, and forms a muffler room. And according to this configuration, each inhalation opening path is made shortest, the pulsation produced in each inhalation opening path can be controlled, the evil by pulsation can be avoided, and improvement and oscillating reduction of compressor effectiveness can be aimed at.
[0077] Invention according to claim 5 arranges a muffler room to the edge wall exterior of the near well-closed container of a countershaft carrier, penetrates the edge wall of a well-closed container outside, and prepares an inhalation opening path in it. And according to this configuration, shortening of an inhalation opening path and heating of a muffler room are prevented, and compression efficiency can be improved.
[0078] Invention according to claim 6 arranges a muffler room to the edge wall exterior of the near well-closed container of a countershaft carrier, penetrates the edge wall of a countershaft carrier and a well-closed container outside, and prepares an inhalation opening path in it. And according to this configuration, by further shortening of an inhalation opening path, while being able to lessen the pulsation produced in an inhalation opening path, heating of an inhalation gas is prevented, and compression efficiency can be improved further.

[0079] Invention according to claim 7 makes a muffler room hold mainly to a well-closed container with the communicating tube which constitutes an inhalation opening path. And according to this configuration, arrangement of the muffler room to a well-closed container can be performed simply, and low cost-ization of a compressor can be realized.
[0080] Invention according to claim 8 arranges symmetrically with ** the opening location to the muffler room of each inhalation path to the core of said muffler room. And according to this configuration, pulsating attenuation in a muffler room can be enlarged and the oscillation of the inhalation pipe line can be reduced.
[0081] Invention according to claim 9 makes the lowest style edge of the suction pipe linked to the compressor external inhalation pipe line invade to the center section of the muffler room, and makes said lowest style edge arrange above the opening edge to the muffler room of each inhalation path. And according to this configuration, the vapor-liquid interflow object which flows into a muffler room from the compressor external inhalation pipe line prevents flowing into each compression space as it is, avoids liquid compression, and can improve compressor endurance.
[0082] Invention according to claim 10 arranges the lowest style edge of the suction pipe connected to a common rough center to each opening to the muffler room of each inhalation path at the compressor external inhalation pipe line. And according to this configuration, pulsating attenuation in a muffler room can be enlarged further, and the effectiveness that improvement in compression efficiency and the oscillation of the inhalation pipe line can be reduced is done so.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] Drawing of longitudinal section of the rolling piston mold rotary refrigerant compressor in which one example of this invention is shown
[Drawing 2] The cross-sectional view which met the A-A line in drawing 1
[Drawing 3] The important section sectional view of the rolling piston mold rotary refrigerant compressor in which another example of this invention is shown
[Drawing 4] Drawing of longitudinal section of the conventional rolling piston mold rotary compressor
[Drawing 5] The compression zone cross-sectional view of this compressor
[Drawing 6] The compression zone cross-sectional view of another conventional rolling piston mold rotary compressor
[Drawing 7] Load torque fluctuation property drawing of this compressor
[Drawing 8] The cross-sectional view of a congener compressor
[Drawing 9] Important section drawing of longitudinal section of still more nearly another conventional rolling piston mold rotary compressor
[Drawing 10] (a) Compression principle explanatory view of the -(d) said compressor
[Description of Notations]

1 Well-closed Container
2 Motor
3 Compression Zone
6 Driving Shaft
7 Crank Section
8 Main Bearing
9 Countershaft Carrier
10 Roller
11 Cylinder Block
14 24 Blade
15 Cylinder
26 27 Compression space
28 30 Inhalation opening
29 31 Delivery
50 Muffler Room
64 65 Communicating tube
82 Diaphragm

[Translation done.]

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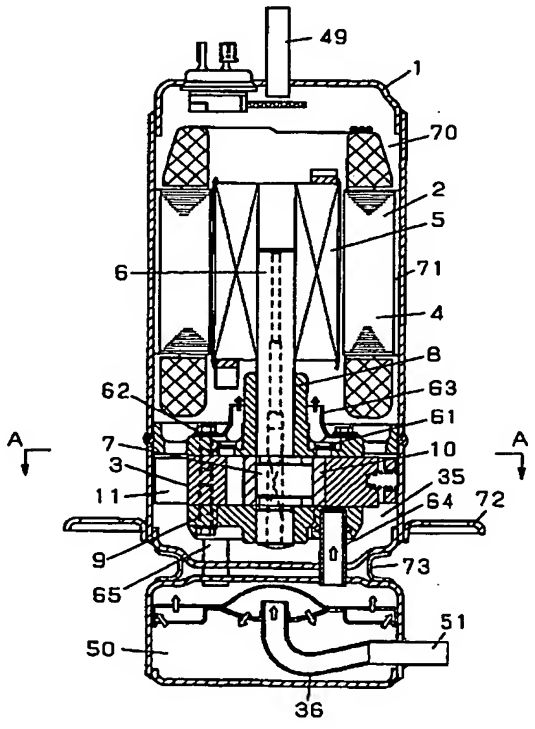
(54)【発明の名称】　ローリングピストン型ロータリ圧縮機

(57)【要約】

【課題】　一つのシリンダ内に複数の圧縮室を有するローリングピストン型ロータリ圧縮機の吸入通路に生じる脈動による弊害を低減するものである。

【解決手段】　圧縮室２６の吸入口２８，圧縮室２７の吸入口３０と圧縮機外部吸入配管系との間に共通のマフラー室５０を設けると共に、吸入口２８，３０とマフラー室５０との間の連通管６４，６５の長さをほぼ同じにするものである。それによって、各吸入口経路に同等の脈動が生じ、各圧縮室２５，２７の吸入効率と各圧縮トルク変動も同様に発生して、駆動軸６が一回転する間のトルク変動が分散し、電動機２の効率向上と圧縮機配管系の振動低減ができる。



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【特許請求の範囲】

【請求項１】 密閉容器の内部に電動機と圧縮部を配置し、前記圧縮部のシリンダブロックに設けた円筒内面を有するシリンダと、前記電動機に連結する駆動軸のクランク部に外装し且つ前記シリンダの内面に沿って移動するローラと、前記ローラの外周面に先端が摺接すべく前記シリンダブロックから前記シリンダ内に出没して前記円筒内面と前記ローラの外周面とで形成される圧縮室を等間隔で仕切る複数のブレードと、分割された各圧縮室にそれぞれ吸入口と吐出口を備えたローリングピストン型ロータリ圧縮機において、前記各圧縮室の吸入口と圧縮機外部吸入配管系との間に共通のマフラー室を設けると共に、前記各吸入口から前記マフラー室までの各吸入経路長さを概同距離に配置させたローリングピストン型ロータリ圧縮機。

【請求項２】 電動機と反対側の位置に設けて駆動軸を支持し且つシリンダブロックと隣接した副軸受の側にマフラー室を配置する一方、前記副軸受と共に前記駆動軸を支持し且つ前記電動機の側に配置された主軸受の側に各圧縮室の吐出口を配置した請求項１記載のローリングピストン型ロータリ圧縮機。

【請求項３】 各圧縮室の各吸入口経路が副軸受を軸方向に貫通して配設された請求項２記載のローリングピストン型ロータリ圧縮機。

【請求項４】 密閉容器の端部壁と副軸受との間に仕切り部材を配置してマフラー室を形成した請求項１記載のローリングピストン型ロータリ圧縮機。

【請求項５】 副軸受の側の密閉容器の端部壁外部にマフラー室を配置し、前記密閉容器の端部壁を貫通して各吸入口経路を設けた請求項１記載のローリングピストン型ロータリ圧縮機。

【請求項６】 副軸受の側の密閉容器の端部壁外部にマフラー室を配置し、前記副軸受と前記密閉容器の端部壁を貫通して吸入口経路を設けた請求項５記載のローリングピストン型ロータリ圧縮機。

【請求項７】 各吸入口経路を構成する連通管によって主としてマフラー室を密閉容器に保持させた請求項５記載のローリングピストン型ロータリ圧縮機。

【請求項８】 各吸入経路のマフラー室への開口位置を前記マフラー室の中心に対して概対称に配設した請求項１記載のローリングピストン型ロータリ圧縮機。

【請求項９】 圧縮機外部吸入配管系に接続する吸入管の最下流端をマフラー室の中央部まで侵入させ、前記最下流端を各吸入経路のマフラー室への開口端よりも上部に配設させた請求項１記載のローリングピストン型ロータリ圧縮機。

【請求項１０】 各吸入経路のマフラー室への各開口部に対して共通の概中心に圧縮機外部吸入配管系に接続する吸入管の最下流端を配設した請求項１記載のローリングピストン型ロータリ圧縮機。

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【発明の詳細な説明】

【０００１】

【発明の属する技術分野】本発明はロータリ圧縮機の吸入通路に関するものである。

【０００２】

【従来の技術】空調機用圧縮機に多く使用されているローリングピストン型ロータリ圧縮機の構造は、図４に示す縦断面，図５に示す圧縮要素部横断面で代表される如く、周知されている。

【０００３】すなわち、密閉容器１０１の内部に電動機１０２と、この電動機１０２に駆動される圧縮部１０３を設けて構成され、圧縮部１０３の駆動軸１０６が電動機１０２に連結されてシリンダブロック１１１の両側に配置された主軸受１０８と副軸受１０９で支持されている。

【０００４】シリンダ１１９を備えたシリンダブロック１１１の内側には、駆動軸１０６の主軸から偏心したクランク部１０７に外装するローラ１１０がシリンダ１１９の内壁に接近して配置され、圧縮室１１５を形成している。

【０００５】シリンダブロック１１１の案内溝１１２には、ブレード１１４とブレード１１４の先端をローラ１１０に付勢するバネ装置１１３が配置されており、圧縮室１１５が吸入側と圧縮側とに区画されている。

【０００６】シリンダブロック１１１には、ブレード１１４を境としてシリンダ１１９に開口する吸入口１１６と吐出口１１７が設けられている。

【０００７】吸入口１１６には、低圧側冷媒を貯溜するためのアキュームレータ１６０が接続されている。

【０００８】しかしながら、このような一つの圧縮室１１５を有する構成のロータリ圧縮機は、圧縮トルク変動が大きいことから、振動が大きく圧縮機配管系を破損するという課題があり、図６に示す如く、シリンダ２１９内に二つの圧縮室を備えたローリングピストン型ロータリ圧縮機が提案されている。

【０００９】同図は、シリンダブロック１１１に設けた案内溝１２０にブレード１２１とバネ装置１２２を、案内溝１２３にブレード１２４とバネ装置１２５を各々配置して、圧縮室１２６と圧縮室１２７を備えている。

【００１０】圧縮室１２６には吸入口１２８と吐出口１２９が開口し、圧縮室１２７には吸入口１３０と吐出口１３１が開口している。

【００１１】このような二つのブレードを備えた構成の圧縮機は、図７に示す如く、駆動軸２０６の一回転当りの圧縮トルク作用範囲が２分割され、圧縮機振動が図４と図５の構成の圧縮機よりも半減する（特開昭６３－２０８６８８号公報）。

【００１２】一方、上述のシリンダブロック２１１に吸入口２２８と吸入口２３０を備えた圧縮機は、例えば図８で示す如く、吸入側に第１のアキュームレータ２１８

と第２のアキュームレータ２１４を配置する構成となり、吸入配管系簡素化のために図９に示す構成が提案されている（特開平１－２４９９７７号公報）。

【００１３】同図は、アキュームレータ３５０が密閉容器３０１の側壁を貫通して一方の圧縮室の吸入口３４９に接続されると共に、吸入口３４９が他方の圧縮室の吸入口に密閉容器３０１内の連通管３６３を介して連通させている。連通管３６３は、駆動軸３３６を支持する主軸受３３４の軸受ボス部を迂回して構成されている。

【００１４】

【発明が解決しようとする課題】しかしながら、上記従来の構成では、以下に述べる如く、吸入気体流れに基づく課題があった。

【００１５】すなわち、上述のような一つのシリンダブロックに二つのブレードを配置してシリンダ内に二つの圧縮室を形成する圧縮機の圧縮原理は、図１０（ａ）～図１０（ｄ）に示す通りである。

【００１６】すなわち、図１０（ａ）における斜線で示す空間は、圧縮室の最大吸入行程容積の状態を示す。図１０（ｂ）における斜線で示す空間は、圧縮室の最小吸入行程容積の状態で吸入口が閉塞される直前の圧縮室を示し、図１０（ａ）における最大吸入行程容積の状態から縮小している。この吸入行程容積の減少は、吸入気体が吸入口を通じて吸入配管系に逆流することを意味する。図１０（ｃ）における斜線で示す空間は、吸入口が閉塞されて実質的な圧縮開始の状態を示す。図１０（ｄ）における斜線で示す空間は、圧縮室圧力が上昇した結果、吐出口を通じて圧縮室から排出される状態を示す。

【００１７】このような吸入・圧縮行程における吸入気体の流入と逆流が生じるので、図９のような不均等な吸入経路の分流と吸入経路の迂回による経路長さが異なる構成では、吸入経路に生じる脈動が互いに干渉し合い、その結果、吸入経路抵抗が大きくなり、圧縮効率が著しく低下するという課題があった。

【００１８】本発明はこのような従来の課題を解決するものであり、圧縮効率の向上と吸入配管系の振動低減を図ることを目的とするものである。

【００１９】

【課題を解決するための手段】上記課題を解決するために本発明は、各圧縮室の吸入口と圧縮機外部吸入配管系との間に共通のマフラー室を設けて各吸入口経路への脈動干渉を緩和するものである。

【００２０】上記マフラー室の設置によって、圧縮機外部吸入管系の脈動が低減し、吸入配管系の通路抵抗が少なく、圧縮機の吸入効率向上と振動低減が得られる。

【００２１】

【発明の実施の形態】請求項１に記載の発明は、各圧縮室の吸入口と圧縮機外部吸入配管系との間に共通のマフラー室を設けると共に、各吸入口からマフラー室までの

吸入経路長さを概同距離に配置させるものである。そしてこの構成によれば、各吸入口経路に同等の脈動が生じ、各圧縮室の吸入効率と各圧縮トルク変動も同様に発生して、駆動軸が一回転する間のトルク変動が分散する。この結果、電動機の効率向上と圧縮機配管系の振動低減ができる。

【００２２】請求項２に記載の発明は、電動機と反対側の位置に設けて駆動軸を支持し且つシリンダブロックと隣接した副軸受の側にマフラー室を配置する一方、副軸受と共に駆動軸を支持し且つ電動機の側に配置された主軸受の側に吐出口を配置したものである。そしてこの構成によれば、主軸受と電動機との距離が短くなって駆動軸の変形を少なくできると共に、脈動吸収に要する充分な空間のマフラー室を任意の形態で設置可能になる。

【００２３】請求項３に記載の発明は、各吸入口経路が副軸受を軸方向に貫通して配設されたものである。そしてこの構成によれば、各吸入口経路が短くなるので、脈動が低減し、圧縮機外部吸入配管系の振動低減と吸入効率が向上する。

【００２４】請求項４に記載の発明は、密閉容器の端部壁と副軸受との間に仕切り部材を配置してマフラー室を形成したものである。そしてこの構成によれば、各吸入口経路を最も短くでき、各吸入口経路で生じる脈動による影響が回避できる。

【００２５】請求項５に記載の発明は、副軸受の側の密閉容器の端部壁外部にマフラー室を配置し、密閉容器の端部壁を貫通して吸入口経路を設けたものである。そしてこの構成によれば、吸入口経路の短縮化とマフラー室の加熱防止を同時に図ることができる。

【００２６】請求項６に記載の発明は、副軸受の側の密閉容器の端部壁外部にマフラー室を配置し、副軸受と密閉容器の端部壁を貫通して吸入口経路を設けたものである。そしてこの構成によれば、吸入口経路の更なる短縮化により、吸入気体の加熱を防止できる。

【００２７】請求項７に記載の発明は、吸入口経路を構成する連通管によって主としてマフラー室を密閉容器に保持させたものである。そしてこの構成によれば、密閉容器へのマフラー室の取り付けが簡易になる。

【００２８】請求項８に記載の発明は、吸入経路のマフラー室への開口位置をマフラー室の中心に対して概対称に配設したものである。そしてこの構成によれば、マフラー室での脈動減衰作用が大きくなる。

【００２９】請求項９に記載の発明は、圧縮機外部吸入配管系に接続する吸入管の最下流端をマフラー室の中央部まで侵入させ、最下流端を各吸入経路のマフラー室への開口端よりも上部に配設させたものである。そしてこの構成によれば、圧縮機外部吸入配管系からマフラー室に流入する気液混合流体が各圧縮室にそのまま流入するのを防止できる。

【００３０】請求項１０に記載の発明は、各吸入経路の

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マフラー室への各開口部に対して共通の概中心に圧縮機外部吸入配管系に接続する吸入管の最下流端を配設したものである。そしてこの構成によれば、マフラー室での脈動減衰作用が一層大きくなる。

【００３１】

【実施例】以下本発明の実施例について図面を参照して説明する。

【００３２】（実施例１）図１は、ローリングピストン型ロータリ冷媒圧縮機の縦断面を表し、密閉容器１の内部の上部に電動機２、下部に圧縮部３が配置され、圧縮機の外部配管系に接続する吐出管４９が電動機２の上部空間に接続されている。密閉容器１の底外部に圧縮部３の吸入側に連通するマフラー室５０が配置され、吸入管５１がマフラー室５０に接続されている。

【００３３】圧縮部３は、密閉容器１に内接固定された主軸受８と副軸受９がシリンダブロック１１を挟んで固定されている。

【００３４】電動機２の固定子５に連結した駆動軸６が主軸受８と副軸受９に支持され、駆動軸６のクランク部７にローラ１０が装嵌されている。

【００３５】図２に示す如く、シリンダブロック１１に設けた案内溝１２にはブレード１４が装着され、バネ装置１３によってブレード１４の先端がローラ１０に押接されている。また、その反対側位置に設けた案内溝２３にはブレード２４が装着され、バネ装置２５によってブレード２４の先端がローラ１０に押接されている。

【００３６】ブレード１４とブレード２４によって仕切られた圧縮室２６と圧縮室２７に開口する吸入口２８と吸入口３０がシリンダブロック１１の副軸受９取り付け面側に、吐出口２９と吐出口３１がシリンダブロック１１の主軸受８取り付け面側にそれぞれ対称位置に設けられている。

【００３７】吐出弁装置６１と吐出弁装置６２と吐出ガイド６３とが主軸受８に配置されて吐出冷媒通路の一部を成す。

【００３８】吸入口２８に連通する連通管６４と吸入口３０に連通する連通管６５は、副軸受９と密閉容器１の底部を軸方向に貫通して、マフラー室５０に通じている。

【００３９】連通管６４と連通管６５は、密閉容器１の底部とマフラー室５０の外壁とで銀ロー付け固定され、マフラー室５０を支持すべく構成されている。

【００４０】電動機２を収納する電動機室７０の上部空間と下部空間とは、電動機２の固定子４の外側に設けた冷却通路７１で連通している。

【００４１】油溜３５は電動機室７０の下部空間に通じている。マフラー室５０に侵入している吸入管５１の一部に小孔３６が設けられている。

【００４２】７２は圧縮機支持脚、７３は密閉容器１とマフラー室５０との補助固定部材である。

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【００４３】以上のように構成されたローリングピストン型ロータリ冷媒圧縮機について、その動作を説明する。

【００４４】電動機６の回転子５に連結された駆動軸６が回転するに伴い、前述の図１０（ａ）～図１０（ｄ）の圧縮原理によって冷媒ガスが圧縮室２６と圧縮室２７とでそれぞれ吸入・圧縮され、吐出弁装置６１と吐出弁装置６２，主軸受８と吐出ガイド６３との間の環状の通路を経て電動機室７０に排出される。

【００４５】冷媒ガス中に含まれる潤滑油の一部は分離されて油溜３５に帰還し、残りの潤滑油は冷媒ガスと共に吐出管４９を経て圧縮機外部に送出される。

【００４６】吐出冷媒ガスが吐出ガイド６３の内側を通過する際に、主軸受８が冷却される。

【００４７】一方、冷凍サイクル配管系の低圧側から吸入管５１を経由してマフラー室５０に流入した冷媒ガス（潤滑油を含む）は、障害壁面に衝突後、潤滑油の一部を分離して連通管６４と連通管６５を経由して圧縮室２６と圧縮室２７の吸入側に交互に流入する。

【００４８】圧縮室２６と圧縮室２７で吸入行程中の吸入冷媒ガスは、図１０（ａ）～図１０（ｄ）で説明した吸入・圧縮原理によって連通管６４，連通管６５内を出入りする。

【００４９】連通管６４と連通管６５の長さが短いので、圧縮室２６に通じた連通管６４を逆流する吸入冷媒ガスは、マフラー室５０を介して、圧縮室２７の吸入行程中に通じた連通管６５に瞬時に吸い込まれる。

【００５０】このために、マフラー室５０内で生じる吸入冷媒ガスの脈動が抑制される。また、冷媒ガスが連通管６４，連通管６５を逆流する時、圧縮室２６，圧縮室２７での吸入行程中の昇圧は皆無に等しい。

【００５１】冷媒ガスが吸入管５１を通過する際に生じる負圧発生によって、マフラー室５０の底部に貯する潤滑油が小孔３６を通じて吸い上げられ、吸入冷媒ガスに混入する。

【００５２】以上のように上記実施例によれば、圧縮室２６の吸入口２８および圧縮室２７の吸入口３０と圧縮機外部吸入配管系との間に共通のマフラー室５０を設けると共に、吸入口２８，吸入口３０とマフラー室５０との間の連通管６４，連通管６５の長さをほぼ同じにしたことにより、圧縮室２６および圧縮室２７に吸入された冷媒ガスの一部が一時的に吸入口２８と吸入口３０とに逆流する際に脈動が連通管６４，連通管６５内で１８０度の位相をなして同等の大きさで発生する。このために、脈動の影響による圧縮室２６，圧縮室２７の吸入効率と各圧縮トルク変動が対称的に生じるので、駆動軸６が一回転する間のトルク変動を分散することができる。この結果、電動機の効率向上と圧縮機配管系の振動低減ができる。

【００５３】また、連通管６４，連通管６５を通じてマ

フラー室５０に伝播する冷媒ガスの各脈動は、マフラー室５０で減衰される。すなわち、連通管６４から逆流する冷媒ガスはマフラー室５０を通じて連通管６５に吸引され、連通管６４から伝播する冷媒ガス脈動は減衰する。この結果、吸入管５１を通じて圧縮機外部吸入配管系に冷媒ガス脈動が伝播しないので、圧縮機外部吸入配管系の振動を少なくできる。

【００５４】また、吸入冷媒ガスの著しい過給作用が発生しないので、過剰な圧縮負荷を防止できる。

【００５５】また上記実施例によれば、副軸受９の側にマフラー室５０を配置する一方、主軸受８の側に吐出口２９と吐出口３１を配置したものである。そしてこの構成によれば、主軸受８と電動機２との距離が短くなって駆動軸６の曲げ変形が少なくなるので、回転駆動系の不均衡による圧縮機振動と軸受部摩耗を少なくできる。

【００５６】また、脈動吸入に必要な空間のマフラー室５０を任意の形態で設置可能になるので脈動減衰効果を大きくできる。

【００５７】また上記実施例によれば、連通管６４と連通管６５が副軸受９を軸方向に貫通して配設されたことにより、マフラー室５０までの各吸入口経路が短くなるので、脈動の大きさが低減する。この結果、圧縮機外部吸入配管系の振動を低減し、圧縮機吸入効率を向上できる。

【００５８】また上記実施例によれば、副軸受９の側の密閉容器１の端部壁外部にマフラー室５０を配置し、密閉容器１の端部壁を貫通して吸入口２８，吸入口３０とマフラー室５０との間の連通管６４，連通管６５を設けたことにより，吸入口経路の短縮化とマフラー室５０の加熱を防止して圧縮効率を向上できる。

【００５９】また上記実施例によれば、副軸受９の側の密閉容器１の端部壁外部にマフラー室５０を配置し、副軸受９と密閉容器１の端部壁を貫通する連通管６４と連通管６５を設けたことにより、吸入口経路の更なる短縮化により、連通管６４と連通管６５の内部で生じる脈動を少なくできると共に吸入冷媒ガスの加熱を防止できる。

【００６０】また上記実施例によれば、吸入口経路を構成する連通管６４と連通管６５によって主としてマフラー室５０を密閉容器１に保持させたことにより、密閉容器１へのマフラー室５０の配設が簡易にできる。

【００６１】また上記実施例によれば、連通管６４と連通管６５のマフラー室５０への開口位置をマフラー室５０の中心に対して概対称に配設したことにより、マフラー室５０での脈動減衰作用を大きくでき、吸入配管系の振動を低減できる。

【００６２】また上記実施例によれば、連通管６４と連通管６５のマフラー室５０への各開口部に対して共通の概中心に圧縮機外部吸入配管系に接続する吸入管５１の最下流端を配設したことにより、マフラー室５０での脈動減衰作用を一層大きくでき、圧縮効率の向上と吸入配管系の振動を低減できる。

【００６３】（実施例２）図３は、密閉容器８０にマフラー室８１を内蔵した冷媒圧縮機の構成を示す。

【００６４】密閉容器８０の内部は、仕切り部材８２によって上部の高圧空間と下部のマフラー室８１とに仕切られている。

【００６５】仕切り部材８２の外周は、上部密閉容器８０ａの端部と下部密閉容器８０ｂの端部と共に溶接密封されている。

【００６６】吸入管８３の最下流端部は、吸入口２８，吸入口３０に連通する連通管８４，連通管８５の下端部よりも高い位置に設定され、吸入管８３からマフラー室８１に流入する冷媒ガスが、潤滑油を分離することなく連通管８４と連通管８５に直接流入するのを阻止している。その他の構成は図１と同様である。

【００６７】上記実施例によれば、密閉容器８０の端部壁と副軸受９との間に仕切り部材８２を配置してマフラー室８１を形成したことにより、各吸入口経路を最も短くでき、各吸入口経路で生じる脈動による弊害を回避できる。

【００６８】また上記実施例によれば、圧縮機外部吸入配管系に接続する吸入管５１の最下流端をマフラー室５０の中央部まで侵入させ、最下流端を連通管６４と連通管６５のマフラー室５０への開口端よりも上部に配設させたことにより、圧縮機外部吸入配管系からマフラー室５０に流入する気液混合冷媒ガスが圧縮室２６と圧縮室２７にそのまま流入するのを防止できる。

【００６９】また上記実施例によれば、シリンダブロック１１に二つのブレード１４，２４を等間隔に配置させたが、更に多くのブレードを等間隔に配置させた場合も同様の作用効果を発揮する。

【００７０】また、上記実施例では冷媒圧縮機について説明したが、他の気体（例えば、酸素，窒素，ヘリウム，空気など）を圧縮する気体圧縮機の場合も同様な作用・効果を生じるものである。

【００７１】

【発明の効果】上記実施例から明らかなように、請求項１に記載の発明は、各圧縮室の吸入口と圧縮機外部吸入配管系との間に共通のマフラー室を設けると共に、各吸入口からマフラー室までの吸入経路長さを概同距離に配置させたもので、この構成によれば、各圧縮室に吸入された気体の一分が一時的に各吸入口に逆流する際に脈動が吸入口経路で１８０度の位相をなして同等の大きさで発生する。このために、脈動の影響による各圧縮室の吸入効率と各圧縮トルク変動が対称的に生じるので、駆動軸が一回転する間のトルク変動を分散することができる。この結果、電動機の効率向上と圧縮機配管系の振動低減ができる。

【００７２】また、吸入口経路を通じてマフラー室に伝

播する気体の各脈動は、マフラー室で減衰される。すなわち、吸入口経路から逆流する気体はマフラー室を通じて別の吸入口経路に吸引され、気体脈動は減衰する。この結果、圧縮機外部吸入配管系に吸入気体の脈動が伝播しないので、圧縮機外部吸入配管系の振動を少なくできる。

【００７３】また、吸入気体の著しい過給作用が発生せず、過剰な圧縮負荷を防止できる。請求項２に記載の発明は、電動機と反対側の位置に設けて駆動軸を支持し且つシリンダブロックと隣接した副軸受の側にマフラー室を配置する一方、副軸受と共に駆動軸を支持し且つ電動機の側に配置された主軸受の側に吐出口を配置したもので、この構成によれば、主軸受と電動機との距離が短くなって駆動軸の変形を少なくできるので、回転駆動系の不均衡による圧縮機振動と軸受部摩耗を少なくできる。

【００７４】また、脈動吸収に必要な空間のマフラー室を任意の形態で設置可能になるので、脈動減衰効果を大きくできる。

【００７５】請求項３に記載の発明は、各吸入口経路が副軸受を軸方向に貫通して配設されたものである。そしてこの構成によれば、マフラー室までの各吸入口経路が短くなるので、脈動の大きさが低減する。この結果、圧縮機外部吸入配管系の振動を低減し、圧縮機吸入効率を向上できる。

【００７６】請求項４に記載の発明は、密閉容器の端部壁と副軸受との間に仕切り部材を配置してマフラー室を形成したものである。そしてこの構成によれば、各吸入口経路が最も短くでき、各吸入口経路で生じる脈動を抑制し、脈動による弊害を回避し、圧縮機効率の向上と振動低減を図ることができる。

【００７７】請求項５に記載の発明は、副軸受の側の密閉容器の端部壁外部にマフラー室を配置し、密閉容器の端部壁を貫通して吸入口経路を設けたものである。そしてこの構成によれば、吸入口経路の短縮化とマフラー室の加熱を防止して圧縮効率を向上できる。

【００７８】請求項６に記載の発明は、副軸受の側の密閉容器の端部壁外部にマフラー室を配置し、副軸受と密閉容器の端部壁を貫通して吸入口経路を設けたものである。そしてこの構成によれば、吸入口経路の更なる短縮化により、吸入口経路で生じる脈動を少なくできると共に吸入気体の加熱を防止し、圧縮効率を更に向上できる。

【００７９】請求項７に記載の発明は、吸入口経路を構成する連通管によって主としてマフラー室を密閉容器に保持させたものである。そしてこの構成によれば、密閉容器へのマフラー室の配設が簡易にでき、圧縮機の低コスト化が実現できる。

【００８０】請求項８に記載の発明は、各吸入経路のマフラー室への開口位置を前記マフラー室の中心に対して概対称に配設したものである。そしてこの構成によれば、マフラー室での脈動減衰作用を大きくでき、吸入配管系の振動を低減できる。

【００８１】請求項９に記載の発明は、圧縮機外部吸入配管系に接続する吸入管の最下流端をマフラー室の中央部まで侵入させ、前記最下流端を各吸入経路のマフラー室への開口端よりも上部に配設させたものである。そしてこの構成によれば、圧縮機外部吸入配管系からマフラー室に流入する気液混合流体が各圧縮室にそのまま流入するのを防止し、液圧縮を回避して圧縮機耐久性を向上できる。

【００８２】請求項１０に記載の発明は、各吸入経路のマフラー室への各開口部に対して共通の概中心に圧縮機外部吸入配管系に接続する吸入管の最下流端を配設したものである。そしてこの構成によれば、マフラー室での脈動減衰作用を一層大きくでき、圧縮効率の向上と吸入配管系の振動を低減できるという効果を奏する。

【図面の簡単な説明】

【図１】本発明の一実施例を示すローリングピストン型ロータリ冷媒圧縮機の縦断面図

【図２】図１におけるＡ－Ａ線に沿った横断面図

【図３】本発明の別の実施例を示すローリングピストン型ロータリ冷媒圧縮機の要部断面図

【図４】従来のローリングピストン型ロータリ圧縮機の縦断面図

【図５】同圧縮機の圧縮部横断面図

【図６】従来の別のローリングピストン型ロータリ圧縮機の圧縮部横断面図

【図７】同圧縮機の負荷トルク変動特性図

【図８】同類圧縮機の横断面図

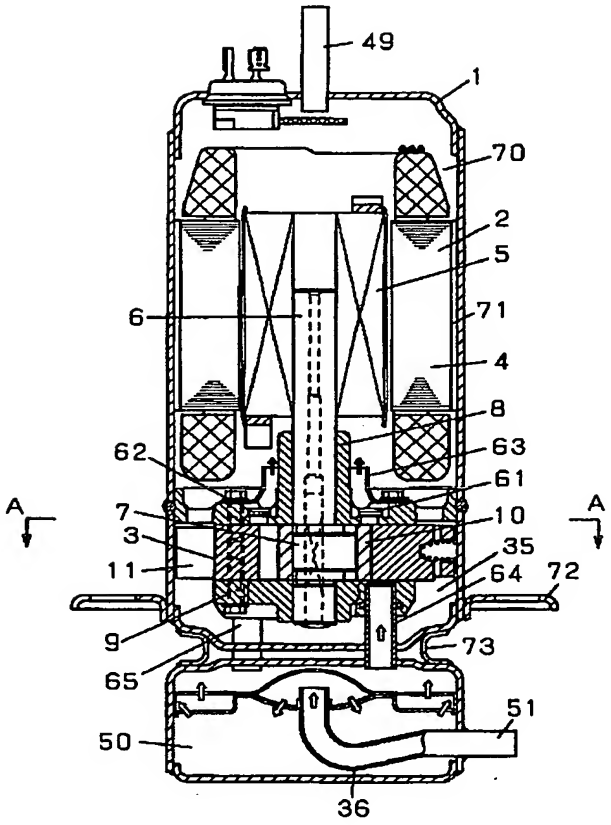
【図９】従来の更に別のローリングピストン型ロータリ圧縮機の要部縦断面図

【図１０】（ａ）～（ｄ）同圧縮機の圧縮原理説明図

【符号の説明】

１　密閉容器
２　電動機
３　圧縮部
６　駆動軸
７　クランク部
８　主軸受
９　副軸受
１０　ローラ
１１　シリンダブロック
１４，２４　ブレード
１５　シリンダ
２６，２７　圧縮室
２８，３０　吸入口
２９，３１　吐出口
５０　マフラー室
６４，６５　連通管
８２　仕切り部材

【図１】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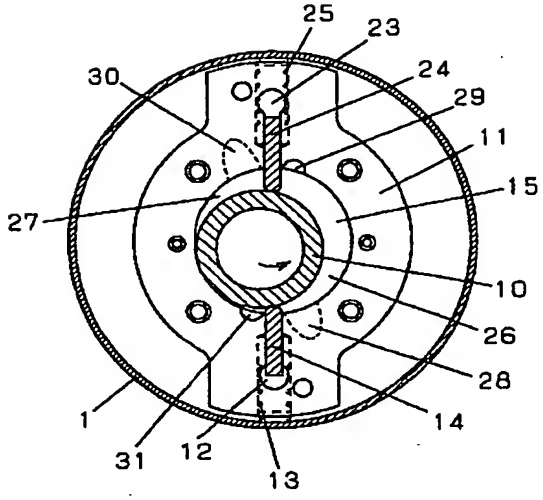
【図２】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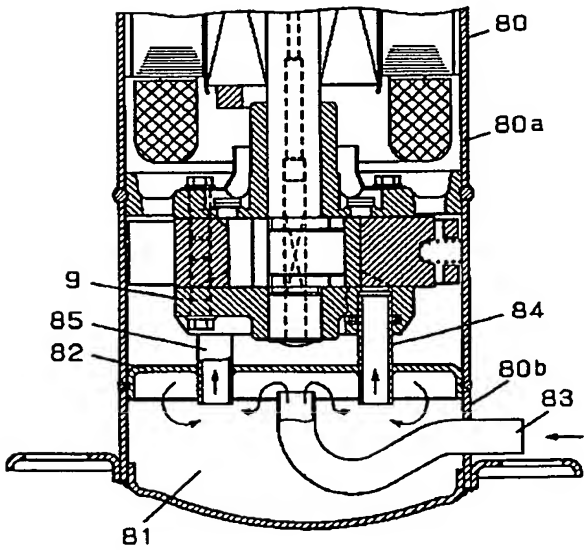
【図３】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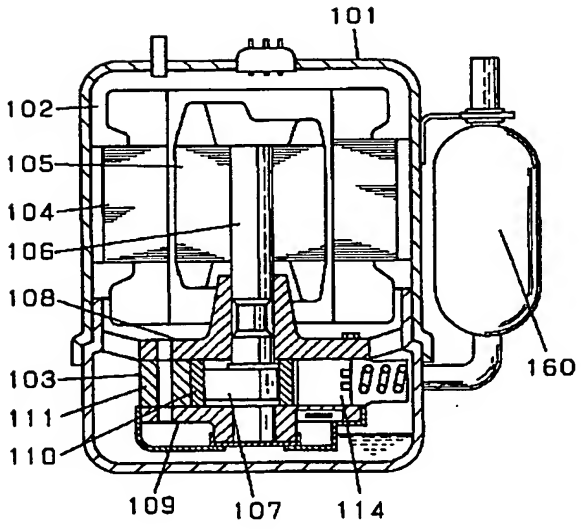
【図４】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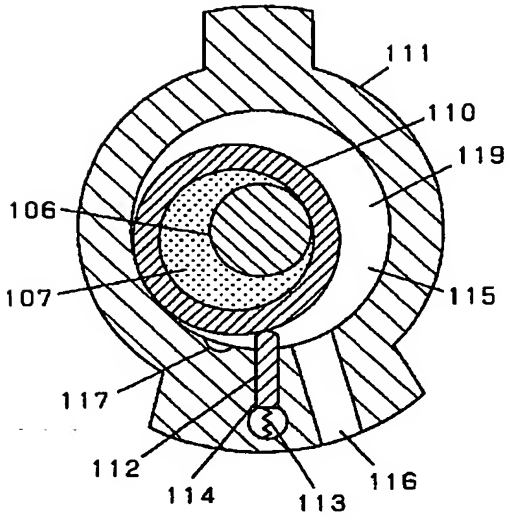
【図５】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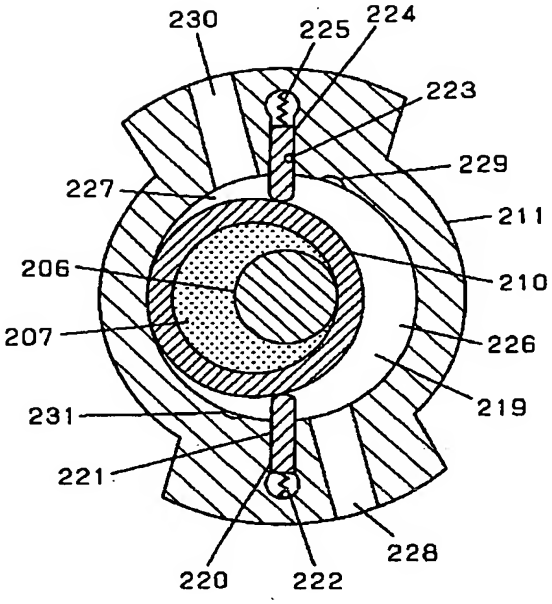
【図６】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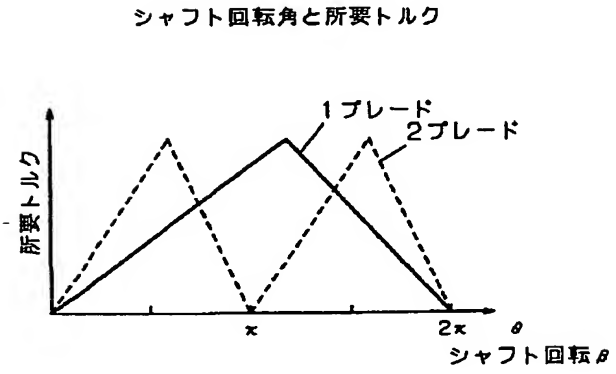
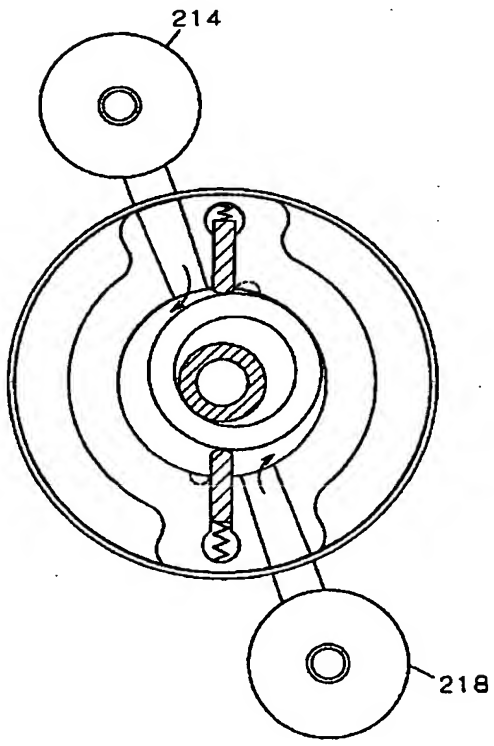
222

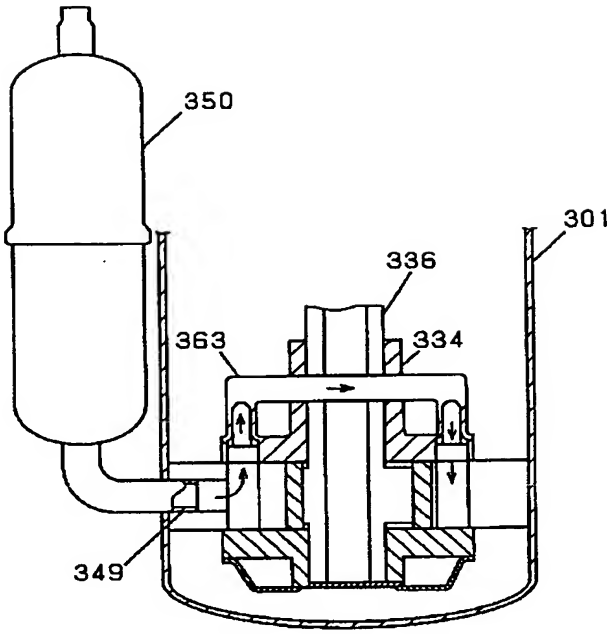
【図７】


シャフト回転角と所要トルク
1ブレード
2ブレード
所要トルク
π
2π
θ
シャフト回転θ

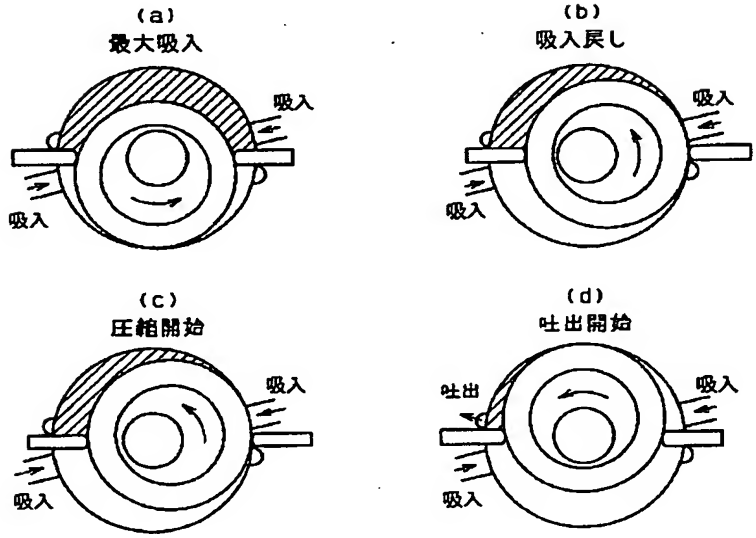
【図８】


214
218

【図９】


350
301
336
363
334
349

【図１０】


(a)
最大吸入
吸入
吸入
(b)
吸入戻し
吸入
吸入
(c)
圧縮開始
吸入
吸入
(d)
吐出開始
吐出
吸入
吸入